

BY ORDER OF THE COMMANDER
HEADQUARTERS, 377TH AIR BASE WING (AFMC)
KIRTLAND AIR FORCE BASE,
NEW MEXICO 87117-5606

KAFB INSTRUCTION 21-102

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Maintenance



**REPAIR AND CALIBRATION OF TEST,
MEASUREMENT, AND DIAGNOSTIC
EQUIPMENT**

COMPLIANCE WITH THIS PUBLICATION IS MANDATORY

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This instruction implements Air Force Policy Directive 21-1, Managing Aerospace Equipment Maintenance and AF Instruction 21-113, Air Force Metrology and Calibration (AFMETCAL) Program. It provides guidance and outlines responsibilities applicable to all organizations requiring support from the 377th Logistics Group's Test, Measurement, and Diagnostic Equipment (TMDE) Division which includes the Precision Measurement Equipment Laboratory (PMEL).

SUMMARY OF REVISIONS

Adds procedures for delivering equipment containing radioactive material to the Production Control Section.

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Chapter 1

INTRODUCTION

1.1. Mission Statement. The PMEL is an activity authorized certain base measurement standards which are normally issued by the Air Force Metrology and Calibration (AFMETCAL) program, Directorate of Metrology, and serves as a link in the traceability of measurements to the National Institute of Standards and Technology or other nationally recognized standards. The base measurement standards are used by the PMEL to calibrate base working standards, which are then used as comparison devices for ensuring the accuracy of all test, measurement, and diagnostic equipment used by supported activities to accomplish their missions.

1.1.1. Organizational commanders must ensure that equipment under their control is repaired, calibrated, and certified as prescribed in AFI 21-113 Air Force Metrology and Calibration (AFMETCAL) Program, Technical Order (TO) 00-20-14, applicable Calibration Measurement Summaries (CMS), TO 33K-1-100-1 (TMDE Interval, Calibration, and Repair, Technical Order Reference Guide and Work Unit Code Manual); AFRD 21-1, Managing Aerospace Equipment Maintenance, and command directives. All equipment in use will be calibrated at regularly scheduled intervals, except as exempted by TO 00-20-14 and TO 33K-1-100-1. Commanders must ensure that all applicable reference materials are available to all work centers that receive support from the TMDE Division.

1.1.2. The mailing address for the TMDE Division is: 377 LG/LGP, 3500 Randolph Ave SE, Kirtland AFB NM 87117-5722. The e-mail address is: LGP at COMM1 (local) or lgp@commgate.kirtland.af.mil (off base).

1.1.3. Production Control (Scheduling) personnel can be contacted by calling 846-6891/fax 846-5886 (commercial), or 246-6891/fax 246-5886 (DSN).

1.2. Scope. This instruction is applicable to all organizations that own equipment requiring support from the TMDE Division.

1.3. References. Owing Work Center (OWC) managers, supervisors, and coordinators must be familiar with the contents of these references as they pertain to the repair and calibration of equipment.

1.3.1. AFI 25-201, Support Agreements Procedures.

1.3.2. AFI 37-138, Records Disposition--Procedures and Responsibilities. (Note: will become AFI 33-338).

1.3.3. AFI 21-113, Air Force Metrology and Calibration (AFMETCAL) Program.

1.3.4. TO 00-20-2, Off-Equipment Maintenance Documentation.

1.3.5. TO 00-20-14, AF Metrology and Calibration Program.

1.3.6. TO 00-25-234, General Shop Practices.

1.3.7. TO 33-1-5, Removal of Batteries from Test Equipment Being Shipped or Stored.

1.3.8. TO 33-1-27, Logistic Support of TMDE.

1.3.9. TO 33-1-32, Power Cord and Receptacle Wiring.

1.3.10. TO 33K-1-100-1, TMDE Interval, Calibration and Repair, Technical Order Reference Guide and Work Unit Code Manual.

1.3.11. TO 37C11-1-1, LOX Gages, Cleaning and Inspection.

1.4. Definition of Terms.

1.4.1. Calibration: A comparison between items of equipment, one of which is a measurement standard of known accuracy, to detect, correlate, and report any variation in the accuracy of other items.

1.4.2. Test, Measurement, and Diagnostic Equipment (TMDE): Devices used to test, measure, evaluate, inspect, or otherwise examine materials, supplies, equipment, and systems to identify or isolate any actual or potential malfunction, or determine compliance with specifications established in technical documents.

1.4.3. Owning Work Center (OWC): an activity that owns equipment requiring support from the TMDE Division.

1.4.4. Precision Measurement Equipment Laboratory (PMEL): a part of the TMDE Division that performs repair and calibration of equipment that is designated as PMEL responsibility in TO 33K-1-100-1.

1.4.5. TMDE Coordinator: a person designated by the owning work center that performs liaison duties between the OWC and the TMDE Division. Serves as the point of contact in the OWC for the TMDE Division and obtains service on all equipment for the OWC.

1.4.6. Unscheduled Calibration. Equipment that does not appear on the monthly TMDE Due Calibration Schedule.

Chapter 2

OBTAINING SERVICE

2.1. Establishment of Work Centers. Organizations that already have a work center established with the TMDE Division should try to integrate new requirements into that account before requesting a new one. Requests for new work centers should be submitted by the maintenance officer or equivalent with a list of equipment by part number, serial number, nomenclature, manufacturer, and quantity. Include your complete mailing address and phone number. Appointment of coordinator (reference paragraph 2.2) may be included with this request.

2.2. Appointment of TMDE Coordinators. Each work center supported by the TMDE Division will appoint a primary and alternate coordinator. The appointment letter will be signed by the work center's maintenance officer or equivalent. The appointment letter will include: full name and rank, telephone number, work center, mailing address and office symbol. Appointment letters must be updated as changes occur or annually.

2.2.1. Each primary and alternate coordinator will receive orientation training conducted by the Production Control Section prior to assuming their duties. Training sessions are held monthly (if necessary). Contact the Production Control Section, 846-6891, for training dates. Coordinators must bring their OWC Coordinator folders to the training class.

2.2.2. Each coordinator will keep a folder which includes, as a minimum:

2.2.2.1. A current copy of this instruction.

2.2.2.2. Letter of appointment for primary and alternate coordinators.

2.2.2.3. Corrected copy of the TMDE Master Inventory Listing.

2.2.2.4. Calibration Schedule.

2.2.2.5. Hand receipts for equipment at PMEL.

2.3. Support Agreements. Each activity that is not part of the 377th Air Base Wing must have an agreement (either host/tenant or interservice) to obtain services from the TMDE Division. (The exceptions are Air Force activities requiring host-tenant support agreements which are exempted in AFI 25-201.) Contact the Wing Plans Office, 846-4232 (commercial) or 246-4232 (DSN) for guidance and information required.

2.4. Pickup and Delivery of TMDE

2.4.1. The Production Control Section will designate a specific day of the week and approximate hour of the day, typically between 0700-1100, on which the owning work center can pick up or deliver TMDE.

2.4.1.1. The TMDE coordinator is expected to pick up or deliver TMDE on the day and time the work center has been scheduled. No equipment will be picked up or delivered unless the coordinator is available to accept or give a receipt. Equipment containing radioactive material must be identified to TMDE Division personnel during inprocessing for calibration or repair.

2.4.1.2. Equipment requiring initial calibration will have an AFTO Form 350, Repairable Item Processing Tag, completed by the coordinator (see Attachment 1). The lower portion of the AFTO Form 350 will serve as the OWC's hand receipt, and therefore must have the end item part number, nomenclature and serial number. No more than five initial calibration items can be delivered at one time.

2.4.1.3. On the pickup/delivery day, the coordinator will deliver equipment that is scheduled for calibration during the next seven days. (Example: Designated pickup/delivery day is Wednesday. Equipment that is due calibration on Wednesday through the following Tuesday will be delivered for calibration.) Equipment that is due for calibration can be determined from the monthly TMDE Due Calibration Schedule or the certification label affixed to the item.

Exceptions to the pickup of scheduled equipment must be coordinated with the Production Control Section.

2.4.1.4. Equipment requiring unscheduled calibration or repair can be delivered along with the equipment that is scheduled. An AFTO Form 350 will be completed (as outlined in Attachment 2) and attached to the equipment.

2.5. Priority Support Requirements. OWCs requiring priority service on equipment will use the format outlined in Attachment 3 to justify each request. This request must accompany the equipment and can be hand delivered, faxed (846-5886), or emailed (LGP) to the Production Control Section. Call the section at 846-6891 for coordination prior to delivery.

2.5.1. Work center supervisors and OWC coordinators will review their monthly TMDE Due Calibration Schedules to identify equipment requiring priority calibration service. Particular attention should be given to equipment due calibration on weekends and holidays. The OWC coordinator will coordinate a scheduled priority five work days before the equipment is due calibration.

2.5.2. An unscheduled priority can be requested at any time during TMDE Division operating hours. After duty hours support can be obtained by contacting personnel identified on placards located on all exterior doors to Building 325 West.

2.5.3. Unit commanders will be notified of OWC's failure to pick up priority items. Priorities must be picked up within one hour of notification.

2.6. Calibration Determination. When equipment is not listed in TO 33K-1-100-1, calibration responsibility must be obtained from AFMETCAL Detachment 1/MLLW.

2.6.1. To assist the TMDE Division, work centers are required to maintain technical data manufacturer's handbook or any commercial data (copies are acceptable) that lists the specifications, accuracy, ranges and parameters of unlisted equipment. This will be sent to AFMETCAL Detachment 1/MLLW as reference for writing an Air Force calibration procedure.

2.6.2. The OWC should list their mailing address along with the name of the coordinator and work center number on the inside cover of the data. This data will be returned when action is completed by the Directorate of Metrology.

2.6.3. When possible, the equipment will be initially calibrated to manufacturer's specifications, with an interval not to exceed 12 months.

2.7. Oxygen Gauges. Work centers having oxygen gages will comply with the provisions of TO 37C11-1-1 before turning in the gages for calibration. The TMDE Division must, by directive, refuse service on gages not in compliance with specified cleanliness standards or documentation.

2.8. No Periodic Calibration Required (NPC). Equipment that meets the criteria of TO 00-20-14 para. 3.2.3, may be designated as NPC, providing it has received an initial calibration. To obtain NPC status on equipment, a written request must be submitted to the TMDE Division. The equipment will not be submitted to the PMEL unless it requires further calibration or repair.

2.8.1. New calibration labels will be supplied by the TMDE Division. The OWC is responsible for removing the old labels and affixing new ones.

2.8.2. Equipment that has been designated as NPC will require calibration after any repair.

2.9. Calibrate Before Use (CBU). Work centers that own equipment which meets the criteria in TO 00-20-14, paragraph 3.2.2, can have it designated CBU. The equipment must be initially calibrated prior to designating it CBU.

2.10. No Calibration Required (NCR). Equipment listed in TO 33K-1-100-1 as NCR and not listed on the OWC Master Inventory Listing will be identified by part number, serial number, nomenclature and manufacturer to the Production Control Section. The OWC is responsible for affixing labels to equipment identified in TO 33K-1-100-1 as NCR, NCR/USER, and may be asked to affix these labels to equipment identified as NCR/PMEL.

2.11. Extension of Calibration Due Dates. Equipment used in support of test projects may have its calibration due date extended by mutual agreement between the test director and the TMDE Division Chief, if removal of the equipment for calibration would adversely affect the test being conducted. The due date may be extended to the end of the test or 50 percent of the assigned interval, whichever is applicable. The test director must verify that the extension is at his or her request and that the PMEL is no longer responsible for the accuracy of the equipment.

2.11.1. Requests must be submitted in writing and signed by the project manager or director.

NOTE:

Requests from Phillips Research Site will be routed directly to the TMDE Division Chief.

2.11.2. The request must be received in the TMDE Division prior to the expiration date of the original calibration due date.

2.11.3. The TMDE Division will supply new certification labels that reflect the new dates due for calibration and prior limitations (if any). The OWC is responsible for removing the old calibration label and affixing new ones to equipment.

2.11.4. Organizations that require extensions of due dates on mission equipment must submit their requests to the applicable command functional area manager. When approval is received, send a copy to the TMDE Division. Records will be updated and a new certification label will be prepared. Comply with paragraph 2.11.3.

Chapter 3

OPERATION

3.1. Hours of Operation. The TMDE Division is for business from 0700-1530, Monday through Friday. Pickup and delivery of equipment will only be done at scheduled times. Status of equipment may be obtained during these hours by calling the Production Control Section, 846-6891. Scheduling priority equipment may be done anytime between 0700-1530, Monday through Friday. After duty hours, priority service may be obtained by calling personnel identified on exterior doors of Building 325 West.

3.2. TMDE Due Calibration Schedule. The Production Control Section will produce three copies of this equipment schedule monthly. It lists all equipment overdue for calibration from previous months, equipment that is in the TMDE Division when the schedule is produced, and all equipment due for calibration for the month designated. NOTE: This schedule only includes equipment for which the TMDE Division has maintenance responsibility. It does not include Category 2 type equipment. Schedules for that type of equipment must be obtained from the servicing production control unit.

3.2.1. OWC coordinators should check and correct, if necessary, all entries on this schedule and return one corrected copy to 377 LG/LGP within 10 days of receipt.

3.2.2. This schedule is usually available for pickup by the OWC by the 28th of each month.

3.3. Hand Receipts. A hand receipt for each piece of equipment due calibration for the month will accompany the TMDE Due Calibration Schedule.

3.3.1. OWC coordinators will attach the receipt to the equipment before delivery to the Production Control Section.

3.3.2. The hand receipt will be signed by Production Control Section personnel and will serve as the OWC's hand receipt. This copy must be surrendered upon pick up of equipment at the Production Control Section.

3.3.3. Under no circumstances will equipment be returned to the OWC without a hand receipt. If a hand receipt is misplaced or lost, the unit commander must write a letter to 377 LG/LGP, identifying the item and stating that the organization does, in fact, own the equipment before the equipment will be released. This is necessary to protect all owners of equipment.

3.4. TMDE Master Inventory Listing. The Production Control Section will produce three copies quarterly. It lists all the equipment receiving maintenance support from the TMDE Division. This listing will be corrected and one copy returned to 377 LG/LGP within 10 days of receipt. Each OWC

should keep a corrected copy of this listing until a new updated listing is received.

3.5. Equipment Awaiting Parts (AWP). The Materiel Control Section, 846-6891, will notify the OWC when equipment is placed into an AWP status. Means of notification will be by letter to the TMDE coordinator. In many instances, because of the age of the equipment or low consumption rate, replacement parts are difficult to obtain. When requested, work centers should provide information to the Materiel Control Section that can be used to submit mission impact statements to base Supply for parts on requisition which have bad status or the estimated delivery date is more than are 60 days beyond the requisition date. Determination of "not reparable this station" (NRTS) and replacement actions are based on the own-

ers' needs to accomplish their missions. It is impossible for the Materiel Control Section to know how each item of equipment is used or what the effect may be of its nonavailability. Communication between the owner and the Materiel Control Section is essential for timely parts deliveries.

3.6. Overdue TMDE. Organizational commanders must ensure that work centers adhere to the TMDE Due Calibration Schedule to prevent equipment from becoming overdue for calibration.

3.6.1. Equipment that is not received by its scheduled due date is overdue for calibration.

3.6.2. The Production Control Section will identify overdue equipment to the unit commander by letter. Equipment that is 30 days overdue will be deleted from the TMDE Master Inventory Listing.

3.7. Care of TMDE. The owning work center is responsible for ensuring that:

3.7.1. External cords, cables, accessories and special adapters are secured to the equipment case before movement.

3.7.2. The equipment is clean externally. The Production Control Section may refuse to accept equipment that is dirty.

3.7.3. All unmated connectors are covered with moisture and vapor proof caps prior to transporting equipment to the TMDE Division. Connectors that contain circuitry subject to damage by Electro-Static Discharge (ESD) will be covered with conductive caps (reference TO 00-25-234). NOTE: DO NOT SUBSTITUTE TAPE FOR CAPS.

3.7.4. All equipment is handled as delicate instruments.

3.7.5. Maximum protection and adequate cushioning is provided during transportation to and from the TMDE Division.

3.8. Technical Data (User Supplied). The TMDE Division will not maintain a technical order library for customer owned TMDE. OWCs are responsible for the requisition and maintenance of technical orders for their equipment. The TMDE Division will notify the OWC when maintenance date is required. The OWC will deliver it to the Production Control Section for use and it will be returned with the equipment. If pertinent data is not available, the equipment will be returned to the OWC, who will reschedule it upon receipt of the technical data.

NOTE: Ensure that the name of the person who requested the data is attached to the data. This will assist the Production Control Section in routing the data to the proper calibration area.

3.9. Abuse of TMDE. Equipment found to be abused will be identified by letter to the commander of the owning unit. The abused equipment will be returned to the OWC and will not be rescheduled into the Production Control Section until acknowledgment of damaged equipment is received in writing from the OWC's unit commander. Recurring instances will be elevated to the appropriate level of command for corrective action. Cost of repair may be deferred to the owning organization.

3.10. Unserviceable Equipment. OWCs receiving equipment from base Supply will leave all condition tags attached to the equipment. If the equipment is found defective during initial calibration, the following procedures will apply:

3.10.1. If appropriate, equipment issued from depot stock or shipped from a manufacturer will be returned to the OWC for submission of a Quality Material Deficiency Report (QMDR). The

TMDE Division will furnish technical details relating to the cause of failure. Action by the depot on the QMDR will determine disposition of the unserviceable unit.

3.10.2. In some cases, warranty repair is available on new items. Warranty items in need of repair will be returned to the OWC for processing to the manufacturer. The TMDE Division will furnish technical details of rejection or failure, as well as warranty information and procedural processing information.

3.11. Lost Equipment Processes. Equipment is rarely lost. Usually these items were shipped off base for support at a depot or manufacturer. The Production Control Section will notify customers of any lost shipments immediately upon discovery. OWC equipment custodians should immediately begin a report of survey. Documentation of a custody trail can be obtained from the Production Control Section supervisor in the form of shipping receipts, advanced copies and Transportation Control Number(s). The TMDE Division will continue to search for the item by all means possible.

Chapter 4

OTHER

4.1. Mission Changes. Supervisors should coordinate with the TMDE Division Chief as far in advance as possible for known mission changes, exercises and inspections. This coordination will allow PMEL to plan support requirements and services needed to meet customer needs.

4.2. Modernization of TMDE. The TMDE Division Chief, or his/her designated representative, will assist any work center desiring to update or modernize its equipment inventory with current-generation equipment. You may receive this service by calling 846-0646 for an appointment.

4.3. Use of Inspectors. When equipment is received from the TMDE Division with a malfunction or other discrepancy, the OWC coordinator will notify the Quality Evaluation Office (846-5434) at the first opportunity. The coordinator should have all pertinent information available during this conversation. If serviceability cannot be ascertained, an evaluator will make an on-site evaluation and correction of the malfunction when practical. It may be necessary to reschedule the equipment for maintenance. A TMDE technician and a technician from the work center may deliberate to resolve the problem. If the difficulty is not resolved to the OWCs satisfaction, the difficulty should be reported to the TMDE Division Chief for resolution.

4.4. Disposition. Dispose of documentation created by this instruction using AFI 37-138, Records Disposition—Procedures and Responsibilities (Note: Instruction will be changed to AFI 33-338).

GARY L. BLEDSOE, Colonel, USAF
Commander, 377 Logistics Group

Attachment 1**INSTRUCTIONS FOR COMPLETING AFTO FORM 350 FOR INITIAL CALIBRATION**

Enter the following information in the blocks identified:

3. B

3A. Enter SRD

4. Y

11. Enter part/lot number with all options

12. Enter serial number

14. INITIAL CALIBRATION REQUIRED. NOTE: If equipment has a malfunction, please explain it fully.

15. Enter name and phone number of person with knowledge of equipment

15B. OWC

17. Enter nomenclature

18. Enter part number

19. OWC

Attachment 2

INSTRUCTIONS FOR COMPLETING AFTO FORM 350 FOR UNSCHEDULED CALIBRATION OR REPAIR

Enter the following information in the blocks identified:

2. Enter label number

3. B

3A. Enter SRD

4. V or F (appropriate)

11. Enter part/lot number with all options

12. Enter serial number

14. Thoroughly explain malfunction or explain why unscheduled calibration is required.

15. Enter name and phone number of person with knowledge of equipment

15B. OWC

17. Enter nomenclature

18. Enter part number

19. OWC

Attachment 3**REQUEST FOR PRIORITY PROCESSING OF EQUIPMENT MEMORANDUM FOR 377 LG/
LGP**

FROM:

SUBJECT: Request for Priority Processing of Test, Measurement, and Diagnostic Equipment (TMDE)

1. Request the following item be processed on a priority basis:

a. Part Number:

b. Serial Number:

c. Nomenclature:

d. Label Number:

e. OWC:

f. Date Due Calibration:

g. Required Completion Date:

2. Justification: Please explain why it is urgent that your equipment take precedence over other equipment, i.e., impairment of mission, delaying test project, etc. (NOTE: A requirement to have the equipment on hand in case it is needed does not constitute a priority.)

3. Does the lack of this equipment create a mission incapable reportable condition in your work center? If yes, indicate the Standard Reporting Designator of the item causing this condition.

4. Civilian overtime: Authorized/Not Authorized (NOTE: PMEL personnel will not work overtime on equipment unless funding is provided by the owning activity.)

5. One-of-a-Kind Item: Yes/No

6. Used in support of:

7. Point of contact: Name/Phone Number

(This request must be signed by the project manager, maintenance supervisor, or the organizational commander.)

Signature